

**ABSTRACT**

The invention relates to a process for hydrotreatment of a hydrocarbon feedstock, comprising the step of carrying out in situ or ex situ sulfurization of a catalyst and hydrotreating the hydrocarbon feedstock in the presence of the catalyst wherein at least one sulfur compound may be present in the feedstock; and a process for the purification of a hydrocarbon feedstock, comprising hydrotreating the hydrocarbon feedstock in the presence of a catalyst after sulfurization of the catalyst and oxidizing desulfurization of the hydrotreated feedstock; wherein the catalyst comprises a refractory oxide support, at least one metal of the Group VIII and at least one metal of the Group VI, both in an oxidized form, and at least one sulphone or sulphoxide compound derived from a benzothiophene compound.